

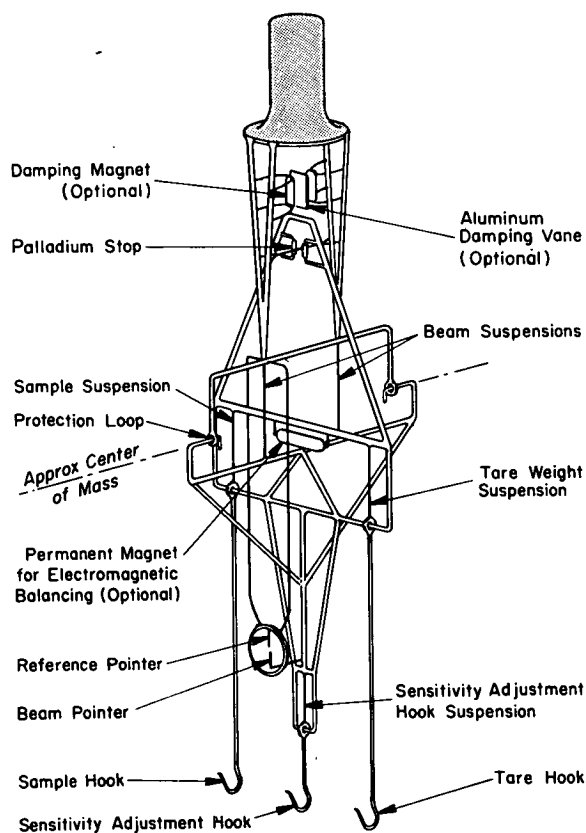
NASA TECH BRIEF

Manned Spacecraft Center



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Improved Laboratory Gradiometer Can Be A Field Survey Instrument



Improvements made to a quartz gradiometer to minimize or eliminate disturbing effects from known error sources permit a sensitivity of $\pm 1 \times 10^{-9} \text{ sec}^{-2}$ or better and a measuring accuracy of $\pm 5 \times 10^{-9} \text{ sec}^{-2}$. This performance is considered adequate for application of the gradiometer as a field survey instrument.

The sensing element of the gradiometer is a sensitive fused quartz balance. The illustration shows the basic configuration of the element.

Two equal 10 gram balance weights are suspended from the gradiometer element. The two weights hang nearly in the same vertical line with one weight a known distance below the other. The vertical gravity gradient creates a differential force between the two weights which causes the balance arm to tilt through a deflection angle. This deflection angle is proportional to the gravity gradient, and once calibrated is a measure of the gradient. Direct optical scales or capacitor-transducer sensors measure the deflection angle. Varying a small weight on the center hook adjusts the sensitivity.

The increasing need for raw materials and natural resource exploration should make this innovation of interest in minerological surveying applications.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
Manned Spacecraft Center, Code JM7
Houston, Texas 77058
Reference: TSP72-10001

Patent status:

No patent action is contemplated by NASA.

Source: Lloyd G. D. Thompson, Mark H. Houston,
Daniel A. Rankin, and Earl M. Yavner
General Oceanology, Inc.
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